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Review Article

Chhaya: a review of India's unique non-hormonal oral contraceptive

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ABSTRACT

Centchroman, which is also marketed as "Chhaya" under the National Family Planning Programme of India. It is the world's only non-steroidal, non-hormonal, once-weekly oral contraceptive. It was first synthesised at the Central Drug Research Institute (CDRI), Lucknow in 1967 and licensed in 1991. Later in April 2016, Chhaya was introduced free of cost into India's national family plaining programme. Despite the safety profile, its uptake remains far below its potential. This review synthesizes the published Indian evidence on the clinical efficacy, safety, acceptability, and programmatic challenges of centchroman as a contraceptive, with an emphasis on the postpartum and post-abortion contexts. A narrative review of peer-reviewed studies, government guidelines, and quality-improvement (QI) initiatives conducted in India was performed. Across the studies, Pearl Index values ranged from 0.2 to 2.0 per hundred woman-years, satisfaction rates reach 77-95%, and delayed or irregular menses is the most consistently reported side effect (8-26%). Access barriers and preference for alternative methods are the leading reasons for discontinuation. QI interventions that emphasize structured counselling and supply-chain strengthening have dramatically increased acceptance rates. Centchroman is a safe, effective, and reversible contraceptive that occupies a unique niche in India's family planning landscape. Programmatic investment in counselling, drug availability, and mHealth support is needed to translate its pharmacological promise into wider use.

Keywords: Centchroman, Chhaya, Non-hormonal contraceptive, Postpartum contraception, India, Family planning

INTRODUCTION

India launched the world's first national family planning programme in 1952, and over successive decades its focus has evolved from demographic control toward promoting maternal and newborn health.[1] Despite considerable progress, the fifth National Family Health Survey (NFHS-5, 2019-2021) reported an unmet need for contraception of 9.4%, with 3.6% specifically for spacing methods.[2] The immediate postpartum period is a particularly critical window as women are highly motivated to delay subsequent pregnancies yet have limited safe contraceptive options, especially those who are breastfeeding.[3]

Conventional oral contraceptives, combined estrogen-progestin pills and progestin-only minipills are widely used globally but carry some limitations for postpartum and lactating women, including concerns about estrogenic side effects, impact on milk supply, and contraindications in women with cardiovascular/metabolic comorbidities.[4] Against this backdrop, centchroman represents a genuinely distinctive pharmacological entity, as it is the world's only non-steroidal, non-hormonal, once-weekly oral contraceptive currently in clinical use.[5,6]

Synthesized in 1967 by the CDRI in Lucknow, centchroman was approved for marketing in 1991 and subsequently commercialised under the trade names Saheli. In April 2016, the Ministry of Health and Family Welfare (MoHFW) introduced it free of cost into the National Family Planning Programme as "Chhaya", placing it within a basket of government-supplied spacing methods available at public health facilities nationwide.[7]

Yet nearly a decade after its programmatic inclusion, awareness among both providers and users remains suboptimal.[8]

This review synthesizes the existing Indian literature on the clinical efficacy, safety, acceptability, and programmatic experience with centchroman, drawing on original research articles, government reference manuals, and QI studies. The objective is to provide a concise, evidence-based resource that supports clinicians, programme managers, and researchers working to expand access to this underutilised contraceptive.

CLINICAL EFFICACY

The contraceptive efficacy of centchroman has been evaluated across multiple Indian studies spanning postpartum, post-abortal, and interval-period populations. The Pearl Index the standard metric of contraceptive failure expressed as pregnancies per hundred woman-years (HWY) of use consistently falls in a range comparable with other short-acting user-dependent methods.[9]

In a recent two-year study at AIIMS, New Delhi involving 241 postpartum women, only two pregnancies occurred, both attributable to missed doses, yielding a Pearl Index of 0.42 HWY (95% CI: 0.05-1.52).[9] Radhika et al reported a Pearl Index 0.22% following a structured QI initiative in Delhi.[10] Miuli et al in a comparative randomised study at Safdarjung Hospital, reported a Pearl Index of 0.83 for ormeloxifene versus combined oral contraceptives (COCs) used post-abortion, while Doke and Kamda recorded 2.0 and Nair and Jayasimhan recorded 1.8 in earlier prospective series.[8,11,12]

Across all studies, efficacy is consistently described as high when the drug is taken correctly. User failure, particularly missed doses, is the principal cause of the occasional reported pregnancy, reinforcing the importance of structured adherence support.

SAFETY PROFILE

Menstrual effects

The most consistently documented side effect of centchroman is menstrual irregularity, most commonly delayed or infrequent menstruation (oligomenorrhoea).[13] Clinical studies reports wider range of the issue where 10.7% women at AIIMS New Delhi, 15.1% in an Arunachal Pradesh series and up to 26% in certain other cohorts.[9,12,14] Heavy menstrual bleeding (menorrhagia), irregular cycles, and amenorrhoea have been described but are less frequent. Importantly, these effects appear to diminish with continued use, and several studies note that women with pre-existing menorrhagia experience a therapeutic reduction in blood loss after commencing centchroman, which is a side-benefit consistent with pharmacology and its established therapeutic use in dysfunctional uterine bleeding.[13]

Systemic and metabolic safety

Systemic adverse effects are infrequent and generally minor. Headache and nausea each occurred in approximately 2% of users in the study conducted in Delhi, abdominal discomfort in 1.7%, and breast tenderness in under 1%.[9] Serious adverse events have not been reported in any Indian study reviewed. Because centchroman lacks hormonal activity in the conventional sense, it does not affect coagulation, blood pressure, carbohydrate or lipid metabolism, which make it suitable for women with diabetes, hypertension, thromboembolic risk, or other conditions in which estrogen-containing pills are contraindicated.[13]

Safety during lactation

The safety of centchroman for breastfeeding mother-infant pairs has been specifically evaluated. Paliwal et al and Gupta et al demonstrated that the drug is excreted in breast milk at very low concentrations that pose no clinically meaningful risk to the neonate.[15,16] No adverse effects in infants of centchroman-using mothers have been documented in any Indian study. This profile makes centchroman particularly valuable as an alternative to progestin-only pills for postpartum spacing in lactating women.

Reversibility

Return of fertility after discontinuation is prompt in this method. Because centchroman does not suppress ovulation. So, menstrual cycles and fertility typically resume within one to two months of stopping the drug. This reversibility distinguishes it favourably from longer-acting methods and addresses a key concern of women in the early postpartum period who plan future pregnancies within a few years.[6,15]

ACCEPTABILITY, SATISFACTION, AND CONTINUATION RATES

Across all studies, satisfaction rates among women who use centchroman consistently exceed 85%. The study conducted in Delhi found 93% of 241 users rated their experience as good or excellent, with 88% willing to recommend the method to others.[9] Gupta et al reported comparable satisfaction (95%) and noted that continuation and satisfaction with centchroman at six months were similar to those observed with the post-partum intrauterine contraceptive device (PPIUCD).[17]

Continuation rates show a characteristic pattern across studies: high in the first month (close to 100%), declining to approximately 70-80% by three months, and stabilising thereafter. The study in Delhi found 58% of users were still taking centchroman at 12 months, while the large six-centre Indian cohort reported life-table continuation rates of 78.0% at six weeks, 47.3% at six months, and 32.2% at

24 months, reflecting real-world attrition in a heterogeneous population.[9,18]

The most important finding across studies regarding discontinuation is the primacy of non-pharmacological reasons. Access difficulties such as inability to procure refills from remote areas, lack of drug availability at peripheral health centres, and inability to follow up at the issuing tertiary hospital after consuming the initial discharge strip were rankd as leading causes of stopping the method.[8,9,17] Other reasons include temporary separation from partner (a cultural factor in parts of India), adoption of an alternative method (particularly IUCD or DMPA), and, less commonly, desire for conception.

QI INITIATIVES AND PROGRAMMATIC LESSONS

A recurring theme in the centchroman literature is the dramatic gap between pharmacological promise and real-world uptake. Multiple institutions have documented baseline acceptance rates as low as 2-5% despite centchroman being freely available and programmatically included. Sarkar et al at ESIC Medical College, Faridabad, used a structured QI framework with three successive Plan-Do-Study-Act (PDSA) cycles by deploying information posters, trained nursing staff, and then physician-led counselling and increased postpartum acceptance from 2.9% to 78.2% over 12 weeks, with continuation rates of 96.7%, 89.5%, and 78.6% at one, three, and six months respectively.[19] Radhika et al and a 2024 QI initiative at a medical college in Ambikapur reported similarly striking improvements following structured awareness campaigns, with the latter achieving 70% acceptance among enrolled women and 95.1% continuation at one month.[9,20]

These QI studies collectively establish several programmatic principles: lack of provider awareness and counselling is a more important barrier to uptake than any pharmacological limitation; visual aids combined with nursing staff training can rapidly shift patient and provider attitudes; ensuring drug availability for continued use, through supply to peripheral health centres, ASHAs, and community pharmacies. These are essential to sustaining continuation; and digital reminder systems (mHealth) can improve compliance with the weekly dosing schedule.

CHALLENGES AND GAPS IN CURRENT EVIDENCE

Despite a growing evidence base, important gaps remain. The majority of published Indian studies are single-centre, relatively short-term, and predominantly conducted at tertiary care referral hospitals which may attract higher-risk pregnancies and more educated, urban patients, limiting generalisability to primary healthcare and rural populations. Most studies rely on self-reported outcomes during telephonic follow-up, introducing recall and social-desirability bias. A comparison group using an alternative contraceptive is absent from many studies, restricting head-to-head conclusions. The largest multi-centre dataset (3,139 users across six centres) provides the most robust efficacy and continuation data, but even this was conducted at medical colleges rather than primary health centres.[18]

Long-term data beyond 24 months are limited. Given centchroman's pharmacokinetic properties and the observed pattern of menstrual side effects declining with duration, longer follow-up studies would clarify whether continuation improves after the initial adjustment period. Studies examining centchroman in women with specific comorbidities such a diabetes, hypertension and obesity are needed to define the clinical subgroups who derive the most benefit.

Community-based studies that enrol women through Accredited Social Health Activists (ASHA) workers and primary health centres, rather than tertiary outpatient clinics, are essential to understanding real-world programmatic performance.[21]

RECOMMENDATIONS FOR STRENGTHENING CHHAYA'S ROLE IN INDIA'S FAMILY PLANNING PROGRAMME

Based on the reviewed evidence, the following recommendations are proposed:

Antenatal and intrapartum counselling

Introduction of centchroman should occur during antenatal care visits and at the time of labour ward admission, not merely at discharge. Early exposure to information improves decision-making quality and reduces post-discharge regret.

Supply chain strengthening

Availability must be extended from tertiary hospitals to community health centres, primary health centres, and ASHA workers. The consistent finding that non-availability after the discharge strip is a leading reason for discontinuation is a remediable programmatic failure.

Provider training

Obstetricians, gynaecologists, nursing staff, and ASHA workers require structured training on centchroman's mechanism, appropriate candidates, dosing schedule, and counselling for anticipated menstrual changes.

mHealth adherence support

Weekly dosing is an advantage over daily pills, but structured reminders, voice messages, SMS alerts, or app-based notifications can further improve adherence. A facilitated system would extend this benefit to less tech-savvy users.

Community-based research

Large-scale, multi-centre pragmatic trials enrolling women through primary healthcare settings are urgently needed to quantify the real-world effectiveness, continuation, and cost-effectiveness of Chhaya under routine programmatic conditions.

CONCLUSION

Centchroman (Chhaya) occupies an unparalleled position in the global contraceptive landscape as the sole non-steroidal, non-hormonal oral contraceptive in clinical use. Indian studies spanning more than three decades consistently report Pearl Index values of 0.2-2.0, satisfaction rates of 77-95%, and a side-effect profile dominated by manageable menstrual irregularities. Despite this evidence, Chhaya remains underutilised in the very national programme that distributes it free of cost. The literature points to modifiable barriers: inadequate provider awareness, insufficient counselling, and a supply chain that fails to extend beyond tertiary hospitals. As India continues to refine its reproductive health strategy, centchroman deserves renewed attention as a cornerstone spacing method-particularly for the postpartum and post-abortion periods, for lactating women, and for those seeking a hormone-free approach. This shift moves family planning away from compulsion and toward genuine "choice", which India needs now.

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